

Report Information
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Table of Contents

DataStar Documents.....	1
A lossy method for compressing raw CCD images.....	1
Search Strategy.....	3

A lossy method for compressing raw CCD images.

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Abstract

Describes a lossy method for compressing raw images produced by CCDs or similar devices. The method is very simple: lossy quantization followed by lossless **compression** using general-purpose **compression** tools such as gzip and bzip2. A key feature of the method is that compressed images can be converted to FITS files simply by decompressing with gunzip or bunzip2, and this is a significant advantage for distributing compressed files. The degree of quantization is chosen to eliminate low-order bits that over-sample the **noise**, contain no information, and are difficult or impossible to compress. The method is lossy but gives guarantees on the maximum absolute **difference**, the expected mean **difference**, and the expected RMS **difference** between the compressed and original images; these guarantees make it suitable for use on raw images. The method consistently compresses images to roughly 1/5 of their original size with a quantization such that no value changes by more than 1/2 of a standard deviation in the background. This is a dramatic improvement on lossless **compression**. It appears that bzip2 compresses the quantized images to within a few tens of percent of the theoretical **limit**.

Descriptors

ASTRONOMICAL-TECHNIQUES; **DATA-COMPRESSION**; IMAGE-PROCESSING.

Classification codes

A9575M Astronomical-data-and-image-processing*;
A4230V Image-processing-and-restoration;
B6135 Optical-image-and-video-signal-processing*;
C5260B Computer-vision-and-image-processing-techniques*.

Keywords

lossy-method; **raw-CCD-image-compression**; lossy-quantization; lossless-**compression**; gzip; bzip2; compressed-images; FITS-files; gunzip; bunzip2; quantized-images; astronomical-images.

Treatment codes

A Application;
P Practical.

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Search Strategy

No.	Database	Search term	Info added since	Results
1	INZZ	compression	unrestricted	113968
2	INZZ	noise	unrestricted	337557
3	INZZ	threshold OR limit	unrestricted	392481
4	INZZ	difference OR subtract OR subtraction	unrestricted	295342
5	INZZ	1 AND 2 AND 3 AND 4	unrestricted	22

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